NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SURFACE DRAINAGE
FIELD DITCH

(ft)

CODE 607

DEFINITION

A graded ditch for collecting excess water in a field.

SCOPE

This standard applies to drainage ditches installed to collect water from a field. It does not apply to Surface Drainage, Main or Lateral (608) or to Grassed Waterways or Outlets (412).

PURPOSE

To drain surface depressions; collect or intercept excess surface water, such as sheet flow, from natural and graded land surfaces or channel flow from furrows and carry it to an outlet; and collect or intercept excess subsurface water and carry it to an outlet.

CONDITIONS WHERE PRACTICE APPLIES

Applicable sites are flat or nearly flat and:

1. Have soils that are slowly permeable (low permeability) or that are shallow over barriers, such as rock or clay, which hold or prevent ready percolation of water to a deep stratum.
2. Have surface depressions or barriers that trap rainfall.
3. Have insufficient land slope for ready movement of runoff across the surface.
4. Receive excess runoff or seepage from uplands.
5. Require the removal of excess irrigation water.
6. Require control of the water table.
7. Have adequate outlets available for disposal of drainage water by gravity flow or pumping.

All Federal, State (80-acre law), and local laws, rules, and regulations shall be followed. The owner or operator shall be responsible for securing all required permits and approvals and for performance in accordance with applicable permits, laws, rules, and regulations.

PLANNING CONSIDERATIONS

Water Quantity

1. Effects on water budget components, especially relationships between runoff and infiltration.
2. The effect of changes in the water table on the rooting depth for anticipated land uses.

Water Quality

1. Downstream effects of erosion and yields of sediment and sediment-attached substances.
2. Effects on the salinity of the soil in the drained field.
3. Effects on the loadings of dissolved substances downstream.
4. Potential changes in downstream water temperature.
5. Effects on wetlands or other water-related wildlife habitat.
6. Effects on the visual quality of downstream water courses.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

DESIGN CRITERIA

Drainage field ditches shall be planned as integral parts of a drainage system for the field served and shall collect and intercept water and carry it to an outlet with continuity and without ponding.

Investigations. An adequate investigation shall be made of all sites.

Location. Ditches shall be established, insofar as topography and property boundaries permit, in straight or nearly straight courses. Random alinement may be used to follow depressions and isolated wet areas of irregular or undulating topography. Excessive cuts and the creation of small irregular fields shall be avoided.

On extensive areas of uniform topography, collection or interception ditches shall be installed as required for effective drainage.

Design. The size, depth, side slopes, and cross section area shall:

1. Be adequate to provide the required drainage for the site.
2. Permit free entry of water from adjacent land surfaces without causing excessive erosion.
3. Provide effective disposal or reuse of excess irrigation water (if applicable).
4. Conduct flow without causing excessive erosion.
5. Provide stable side slopes based on soil characteristics.
6. Permit crossing by field equipment if feasible.
7. Permit construction and maintenance with available equipment.

All field ditches must have a minimum capacity equivalent to the M curve. On farms where high value crops are grown (sugar beets, potatoes, etc.), it may be advisable to design ditches on the C or D curve, provided the outlet drains have the capacity to handle the design flow.

In designing field ditches, a minimum “n” value of .04 shall be used in computing capacity. Where ditches follow a meandering course or where the side slopes are steep enough to lessen the probability of good maintenance, an “n” value of .045 to .05 should be used. An “n” value of 0.025 shall be used in computing allowable velocities.

All field ditches shall be constructed so they will have a depth sufficient to drain the area served. They should provide a minimum depth of 0.5 foot below the low point in the area to be drained, except when the area to be drained is less than 0.5 acre.

The minimum bottom width for field ditches will be 4.0 feet.

Side slopes for field drains shall not be steeper than 3 feet horizontal to 1 foot vertical. Slopes of 6 feet or more horizontal to 1 foot vertical should be used on field ditches which must be crossed during normal farming operations.

Velocities of water in field ditches at design flow using an “n” of 0.025 exceed 2.0 feet per second in sandy soils; 2.5 feet per second in silty loam soils; 3.0 feet per second in gravelly and heavy clay soil. Ditches with velocities in excess of above must be approved by the area engineer.

Spoilbanks should be leveled in a manner which will permit normal farming operations. Where spoil will be placed adjacent to the ditch and at a depth exceeding 3.0 feet, a berm of 10-foot minimum width will be provided.

Where grade control structures are required, standard designs will be used with adequate cross sectional areas to handle the required discharge.

PLANS SPECIFICATIONS

Plans and specifications for constructing drainage field ditches shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.